

**REMARKS:**

The preceding claim amendments and the following remarks are submitted as a full and complete response to the Office Action issued on July 7, 2009. Claims 4 and 8 have been cancelled without prejudice. No new matter has been added. Accordingly, upon entry of the preceding claim amendments, claims 1, 3 and 5-6 are pending. Reconsideration of all outstanding rejections is respectfully requested in view of the foregoing amendment and following remarks.

**Claim Objections**

The Patent Office has objected to claim 8 because of the informality caused by using the term “has” in line 2 instead of “have.” Applicants respectfully submit that since claim 8 has been cancelled, this objection becomes moot, warranting withdrawal of this objection.

**Claim Rejections under 35 U.S.C. §102**

The Patent Office has rejected claims 1, 3-6 and 8 under 35 U.S.C. §102(a) as being anticipated by Cha et al. “Improved Clinical Outcomes Were Obtained From Vitriified Oocytes Using Gold Grid and Slush-Liquid Nitrogen After Failing the Fresh IVF-ET Program” (“Cha”), Fertility and Sterility, Vol. 84, Supplement 1, September 2005, pages S351-S352. Applicants respectfully traverse.

At the outset, claims 4 and 8 have been cancelled as explained below. The authors of the Cha article are Kwang Yul Cha, Soo Kyung Cha, Dong Ryul Lee, Hung

Min Chung, Woo Sik Lee and Tae Ki Yoon. Among the authors, Kwang Yul Cha, Dong Ryul Lee, Hyung Min Chung, Woo Sik Lee and Tae Ki Yoon are Applicants of the present application. Thus, Applicants are the co-authors of the Cha article.

Furthermore, as evidenced by the attached Declaration, Applicants are the sole inventors of the subject matter claimed in the present application and that the others, Soo Kyung Cha and Woo Sik Lee, did not make any inventive contribution to the subject matter claimed in the present application. Thus, the Cha reference is not qualified as prior art under §102(a). See MPEP 715.01(c)I. Accordingly reconsideration and withdrawal of this anticipation rejection are respectfully requested.

The Patent Office has also rejected claims 1, 4-6 and 8 under 35 U.S.C. §102(a) as anticipated by Yoon et al. ("Yoon"), "Successful Clinical Application of Oocyte Vitricification Using Gold Grid and Slush-Liquid Nitrogen", Fertility and Sterility, Vol. 84, Supplement 1, September 2005, page S476. Applicants respectfully disagree.

Like the Cha article, Applicants are also the co-authors of the Yoon article. Furthermore, as evidenced by the attached Declaration, Applicants are the sole inventors of the subject matter claimed in the present application and that the others, Soo Kyung Cha, Jie Ohn Sohn and In Pyung Kwak, did not make any inventive contribution to the subject matter claimed in the present application. Thus, the Yoon reference is not qualified as the prior art under §102(a). See MPEP 715.01(c)I. In this regard, Sections 7 and 8 of the attached Declaration are provided for the clarification of the inventorship of the currently pending claims. More particularly, Hyung Min Chung who is not listed as an author of the Yoon article, but listed as an inventor of the present application, is a co-inventor of claim 3, but did not contribute to conception or reduction

to practice of the subject matter of any of claims 1 and 5-6. Applicants respectfully submit that the attached Declaration effectively removes both the Cha article and the Yoon article from the prior art under §102(a), which warrants withdrawal of these two rejections.

The Patent Office has rejected claims 4 and 8 under 35 U.S.C. § 102(b) as anticipated by Yoon et al. ("Yoon II"), "Pregnancy and Delivery of Healthy Infants Developed From Vitriified Oocytes in a Stimulated In Vitro Fertilization-Embryo Transfer Program," Fertility and Sterility, Vol. 74, No. 1, July 2000, pp. 180-181. While not acquiescing to the propriety in the Patent Office's rejection, Applicants have obviated this rejection by cancelling claims 4 and 8. This amendment is made solely for the purpose of advancing this case toward allowance and Applicants reserve the right to prosecute the subject matter of claims 4 and 8 in the future. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

#### **Claim Rejections Under 35 U.S.C. §103**

The Patent Office has rejected claims 1, 3 and 5-6 under 35 U.S.C. §103(a) as obvious over Yoon II in view of Wheeler et al. (U.S. Patent No. 5,976,567)("Wheeler"). While admitting that Yoon II does not teach gold grid for use in vitrification of human oocytes, the Patent Office alleges that since Wheeler teaches placing vesicles on a gold electron microscopy grid and vitrifying the vesicles by rapid freezing in liquid ethane cooled with liquid nitrogen, it would have merely been a matter of design choice to the skilled artisan to choose a gold grid from amongst the many well-known choices of grids for use in vitrification. Applicants respectfully disagree.

Yoon II teaches loading human oocytes onto a copper grid and then the copper grid was plunged into liquid nitrogen for vitrification of the oocytes. That is, Yoon II is silent in not only using a gold grid as admitted by the Patent Office but also using N<sub>2</sub> slush for vitrification of human oocytes.

On the contrary, claims 1, 3 and 5 require using nitrogen slush for vitrification of human oocytes. As explained in the specification, before the present invention, it was known that using liquid nitrogen for vitrifying oocytes is more advantageous than using nitrogen slush in survival rates of vitrified oocytes. See paragraph [5], page 2 of the specification. However, Applicants surprisingly found that when nitrogen slush was used instead of liquid nitrogen for vitrifying human oocytes, the survival rate of vitrified human oocytes was significantly increased and the apoptosis after thawing was significantly decreased. See paragraph [6]. These findings are fully supported by working examples and drawings of the present application. As shown in Fig. 2, survival rate with intact morphology was increased in vitrified oocytes using nitrogen slush compared to those using conventional liquid nitrogen, that is, 89.0% (211/237) versus 82.4% (252/306). See paragraph [53], page 8 of the specification. In addition, after 3 hours of warming of vitrified oocytes, mean OD value in CC from liquid nitrogen-vitrification was  $0.6168 \pm 0.043$ , which was significantly higher than that in CC from nitrogen slush-vitrification,  $0.4280 \pm 0.036$ . Fig. 3 shows this superior effect of using nitrogen slush for vitrifying human oocytes. See Id.

However, Yoon II fails to teach or suggest using nitrogen slush in vitrifying human oocytes. Rather, given the state of knowledge of one skilled in the relevant art at the time of the invention including the teaching against using nitrogen slush for

vitrifying oocytes, it would not have been reasonably expected that using nitrogen slush in vitrifying human oocytes would result in such a significant improvement of survival rate of vitrified oocytes, which certainly qualifies as unexpected results.

Wheeler does not cure the deficiency of the teaching of Yoon II. First, Wheeler, which teaches a method for the preparation of liquid-nucleic acid particles, involves completely different technology from that involved in the present application. In fact, Wheeler does not even mention vitrification or devitrification of oocytes itself. Therefore, one skilled in the art would not have been motivated to use a gold grid from the teaching of Wheeler in vitrifying human oocytes as described in Yoon II. In fact, until the present application, copper is the only grid that was known for being used for vitrification of oocytes, especially human oocytes.

Even if there were motivation to combine the teachings of Yoon II and Wheeler, the combined teachings would not result in the claimed invention. Like Yoon II, Wheeler is also silent in using slushed nitrogen for vitrification of human oocytes.

To establish *prima facie* obviousness of a claimed invention, all the claim features must be taught or suggested by the prior art. See In re Royka, 180 USPQ 580 (CCPA 1974). Since Yoon II and Wheeler, alone or in combination, fails to teach or suggest all the elements of claims 1, 3 and 5, there is no *prima facie* case of obviousness established, which itself is enough to warrant withdrawal of this obviousness rejection.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

In light of the foregoing, Applicants submit that all outstanding rejections have been overcome, and the instant application is in condition for allowance. Thus, Applicants respectfully request early allowance of the instant application. The Commissioner is hereby authorized to charge any fees or credit any overpayment to Deposit Account No. 02-2135.

Respectfully submitted,

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